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Steven P. Reynolds

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RECYCLING: A REPORT FROM THE LABORATORIES

STEVEN P. REYNOLDS†

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† Legal Counsel, Texas Instruments Incorporated; J.D., Rutgers University (1987); A.B., Georgetown University (1983). The opinions expressed in this article are those of the author and not those of Texas Instruments Incorporated.

There must be power in the States and the Nation to remould, through experimentation, our economic practices and institutions to meet changing social and economic needs.

. . . It is one of the happy incidents of the federal system that a single courageous State may, if its citizens choose, serve as a laboratory; and try novel social and economic experiments without risk to the rest of the country. This Court has the power to prevent an experiment. . . . But in the exercise of this high power, we must be ever on our guard, lest we erect our prejudices into legal principles. If we would guide by the light of reason, we must let our minds be bold.¹

I. INTRODUCTION

SINCE the 1970s, federal regulation of environmental issues has blossomed.² The emergence of environmental consciousness prompted the United States Congress to pass laws, and the Environmental Protection Agency (EPA) to promulgate regulations, controlling the condition and quality of our nation's air, water, and solid waste.³ The complexity of these laws and regulations reflects the difficult task of regulating environmental health

1. *New State Ice Co. v. Liebmann*, 285 U.S. 262, 311 (1932) (Brandeis, J., dissenting) (footnote omitted).

2. The number of federal environmental laws and regulations are extensive. The laws, statutes passed by Congress, are primarily located in Title 42 of the United States Code. The regulations, promulgated under Congressional authority by the Environmental Protection Agency (EPA), are in Title 40 of the Code of Federal Regulations. For a summary of the major environmental laws, see *infra* note 3.

3. A chronological summary of the major laws follows: National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. §§ 4321-4370(a) (1988) (requires preparation of Environmental Impact Statements for development or other projects); Clean Air Act of 1970, 42 U.S.C. §§ 7401-7671q (Supp. II 1990) (air quality standards); Federal Water Pollution Control Act, 33 U.S.C. §§ 1251-1387 (1988 & Supp. 1992) (commonly referred to as Clean Water Act (CWA)) (amending Federal Water Pollution Control Act of 1948) (water quality standards); Safe Drinking Water Act (SDWA), 42 U.S.C. §§ 300(f)-300(j)(10) (1988) (regulates contaminant levels in public drinking water systems); Hazardous Materials Transportation Act (HMTA), 49 U.S.C. §§ 1801-1813 (1988) (regulates all aspects of transport of hazardous materials); Toxic Substances Control Act (TSCA), 15 U.S.C. §§ 2601-2671 (1988) (regulates new chemicals); Resource Conservation and Recovery Act of 1976 (RCRA), 42 U.S.C. §§ 6901-6992(k) (1988) (regulates waste disposal sites); Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 U.S.C. §§ 9601-9675 (1988) (requires cleanup of hazardous waste sites).

and safety in a modern industrial society.⁴ The history of federal environmental legislation appears to show that, initially, a statute is passed which establishes pollution control standards, then, later statutes or amendments are passed to remediate or correct the actual environmental problem.⁵

To date, the federal government has focused its regulatory efforts on controlling the by-products of industrial production (air and water pollution and hazardous waste) as the primary means of cleaning-up the environment.⁶ Far less attention has been placed on regulating the materials used in the product itself, or the materials used in that product's packaging, as an alternative means of achieving similar environmental benefits.

That is the focus of this article - a review of current efforts to recycle materials, primarily nonhazardous materials.⁷ This article concentrates on two aspects of the recycling effort: (1) governmental regulation - including specific approaches already taken by some states and foreign governments, and (2) industry efforts to recycle specific materials or products.

Based on the history of prior environmental laws, the author expects the debate on federal recycling regulation to increase in

4. See generally the statutes listed *supra* note 3. All the federal statutes are long and detailed, and are supplemented by longer and more detailed regulations. Each statute has been substantially amended since its original passage. *Id.* For example, CERCLA was amended in 1986 by the Superfund Amendments and Reauthorization Act (SARA), and major amendments were made to the Clean Air Act in 1990. See Clean Air Act Amendments of 1990, Pub. L. 101-549, 104 Stat. 2399 (1990). Reauthorization and amendment of RCRA is also forecast for 1993. For further discussion of possible amendments to RCRA, see *infra* notes 23, 163, 164 and accompanying text.

5. See generally *supra* notes 3-4 and accompanying text.

6. *Id.*

7. Hazardous waste production and disposal is extensively regulated at the federal level by RCRA and CERCLA. Hazardous waste is defined by RCRA. 42 U.S.C. § 6903(5). Debate continues over the scope of this definition, inclusion within which is a prerequisite for RCRA coverage. See Les Sotsky, *Legal Litter*, LEGAL TIMES, Dec. 16, 1991, at 15-19. (discussing confusion surrounding classification of materials as hazardous waste); see also 40 CFR 261.11(a)(3) (1992) (EPA final rule stating waste is hazardous if it "contains any of the toxic constituents listed in Appendix VIII and [is] . . . capable of posing a substantive present or potential hazard to human health or the environment when improperly . . . managed.").

Although not the primary focus of this Article, recycling of some hazardous materials (antifreeze, batteries, and motor oil) is also discussed herein. For further discussion calling for greater uses of recycling and other waste reduction techniques in the hazardous waste area, see Roberta G. Gordon, *Legal Incentives for Reduction, Reuse, and Recycling: A New Approach to Hazardous Waste Management*, 95 YALE L.J. 810 (1986).

the coming months and years.⁸ Strange bedfellows will call for federal regulation: environmental advocates - who want stronger laws, and corporations - who want a uniform system of laws.

As Justice Brandeis argued some sixty years ago, the states may prove to be the best laboratories for testing proposed recycling regulation.⁹ The author suggests that the current jumble of varying state recycling laws and private industry efforts will prove which alternatives are most effective in achieving society's environmental goals. Justice Brandeis was concerned that without laboratory experimentation change would not take place. Equally valid is the concern that society should not make changes without the benefit of laboratory results. Perhaps the laboratories, both government and private, can save us from over-regulation as well.

II. THE SOLID WASTE PROBLEM AND THE THEORY OF RECYCLING

Many people call America a "throwaway" society. Each year Americans throw away billions of products that, either physically, or merely in the consumer's eyes, have reached the end of their useful life. Included in this "throwaway" mania is a countless amount of product packaging. The EPA estimates that each American generates four pounds of garbage a day.¹⁰ State-by-state figures vary. One source estimated that each Florida resident generated seven pounds of waste a day.¹¹ Residents of Texas produce 18 million tons of garbage annually, which can be broken down as follows: 40% paper; 17.6% yard waste; 8.5% metals; 8% plastic; 7.4% food waste; 7% glass; and 11.6% miscellaneous waste.¹² Another way of breaking down "throwaway" material is by its use. One source cites the following national figures for packaging waste: 30.3% packaging (47.7% of which is paper); 25.1% nondurable products; 20.1% yard waste; 13.6% durable products; 8.9% food wastes; and 1.8% miscellaneous waste.¹³

8. For further discussion of the evolution of prior environmental laws, see *supra* notes 3-5 and accompanying text.

9. See *supra* text accompanying note 1.

10. E. JOSEPH STILWELL ET AL., *PACKAGING FOR THE ENVIRONMENT: A PARTNERSHIP FOR PROGRESS* 4 (1991).

11. William D. Preston & Thomas M. DeRose, *The 1988 Solid Waste Management Act - Facing Up to the "Garbage" Component of Florida's Burgeoning Growth*, 16 FLA. ST. U. L. REV. 597, 598 (1988).

12. Rebecca Perry, *Making the Most of Old Copiers, Bags and Other Discards*, DALLAS MORNING NEWS, Mar. 6, 1992, at 6G, 10G.

13. STILWELL ET AL., *supra* note 10, at 2, 47.

The volume of this waste threatens to overflow America's landfills. In the United States, between 70 and 80% of solid waste is dumped into approximately 6,000 landfills, and the number of landfills is rapidly declining.¹⁴ In 1978 there were approximately 20,000 landfills in the United States; by 1993 the number will be closer to 3,000.¹⁵ The situation varies on a state-by-state basis. Nine states, primarily the Northeastern states, face an immediate crisis; sixteen others will be in a similar predicament by the year 2000.¹⁶

Landfills are regulated by federal and state requirements.¹⁷ It is predicted that new EPA regulations will greatly increase the cost of landfill operations.¹⁸ Public opposition to landfills, the so-called NIMBY (not-in-my-backyard) syndrome, has created additional obstacles to new landfills.¹⁹

Shipment of waste to other states is often prohibited by regulatory and financial considerations. When some states, primarily those in the Northeast, "fixed" their waste problem by shipping it to landfills in other states, the recipient states retaliated by either banning or imposing higher costs on the interstate waste deliveries.²⁰ The United States Supreme Court rejected efforts to im-

14. Jonathan P. Meyers, *Confronting the Garbage Crisis: Increased Federal Involvement as a Means of Addressing Municipal Solid Waste Disposal*, 79 GEO. L.J. 567, 570 (1991); Glenn Ruffenbach, *Alchemist for 1990s Takes On Garbage*, WALL ST. J., Mar. 23, 1992, at B4.

15. Paul M. Barret, *High Court to Enter Waste-Disposal War*, WALL ST. J., Mar. 23, 1992, at B1.

16. See STILWELL ET AL., *supra* note 10, at 105. For a look at the problems facing one state, New York, see Joseph Forti, *Solving the Solid Waste Crisis in New York State*, N.Y. B.J., July 1989, at 30-32, 78-80.

17. See, e.g., Denis J. Brion, *An Essay on LULU, NIMBY, and the Problem of Distributive Justice*, 15 B.C. ENVTL. AFF. L. REV. 437 (1988) (discussing NIMBY and related phenomena); Meyers, *supra* note 14, at 571 (discussing new EPA regulations and NIMBY phenomena); Arnold W. Reitze, Jr. & Andrew N. Davis, *Reconsidering Ocean Incineration as Part of a U.S. Hazardous Waste Management Program: Separating the Rhetoric from the Reality*, 17 B.C. ENVTL. AFF. L. REV. 687, 694-95 (1990) (discussing regulatory and other limits on landfills).

18. See *supra* note 17.

19. See *supra* note 17. An interesting example of the conflicting priorities between environmental cleanup and NIMBY - in Lexington, Kentucky - is evident in the April 22, 1992 issue of the local newspaper, Knight-Ridder's Lexington Herald-Leader. LEXINGTON HERALD-LEADER, Apr. 22, 1992, at A8, B4. The paper features color picture coverage of Earth Day '92 and local recycling efforts and the editors called for all Kentuckians to pledge to help clean-up the environment. *Id.* Meanwhile, a reader's letter to the editor protested the creation of a new landfill in Magoffin County, Kentucky. *Id.*

20. Lawrence R. Hajna, *States Carry Out a Feud Over Trash*, CAMDEN COURIER POST, Nov. 16, 1992, available in LEXIS, Nexis Library, Northeast Newspapers File.

pose outright bans or excessive fees on shipments of out-of-state waste by both Alabama and Michigan,²¹ but the recipient states took the issue to Congress. In July 1992, the Senate passed the Interstate Transportation of Municipal Waste Act which authorized state and local officials to prohibit or restrict interstate deliveries.²² However, the House never voted on an interstate transportation bill, so the legislation died.²³

Export of waste to foreign countries is also limited by regulatory, practical, and ethical considerations. The international shipment of hazardous waste, absent appropriate international agreements between the parties, was banned by the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal; however, the United States Senate has yet to ratify this convention.²⁴ Nonhazardous waste, although no international conventions exist, is not without similar legal, practical, and ethical considerations.²⁵

Dumping in the ocean, deep wells, and other waste disposal options face similar barriers. The Marine Protection, Research and Sanctuaries Act of 1972 and the Ocean Dumping Ban Act of 1988 prohibit the dumping of hazardous waste in the ocean.²⁶

21. *Chemical Waste Management v. Hunt*, 112 S. Ct. 2009, 2016, (1992); *Fort Gratiot Sanitary Landfill, Inc. v. Michigan Dep't of Natural Resources*, 112 S. Ct. 2019, 2028, (1992) (following *Philadelphia v. New Jersey*, 437 U.S. 617, 629 (1978), holding that state laws prohibiting or unduly impacting importation of waste from outside state were unconstitutional interference with interstate commerce); see also *National Solid Waste Management Ass'n v. Alabama Dep't of Env'tl. Management*, 910 F.2d 713 (11th Cir. 1990), modified, 924 F.2d 1001 (11th Cir. 1991); *Hazardous Waste Treatment Council v. South Carolina*, 766 F. Supp. 431 (D.S.C.), *aff'd in part and remanded in part*, 954 F.2d 781 (4th Cir. 1991).

22. S.2877, 102d Cong., 2d Sess. §§ 1-3 (1992); see also CONG. REC. S10,211-10,213 (daily ed. July 23, 1992).

23. *Second Congressional Session Ends, Leaving Decisions for Next Congress*, Daily Rep. for Executives (BNA) No. 199, at C1 (Oct. 14, 1992), available in LEXIS, NEXIS Library, DREXEC File.

24. See *Johnny Cannon et al., Earth to Congress: Amending the Resource Conservation and Recovery Act*, LEGAL TIMES, Dec. 16, 1991, at 24-25; *Waste Shipments: Industry, Administration Urge Senate to Ratify Convention on Waste Shipments*, Int'l Env't Daily (BNA) (Mar. 16, 1992), available in LEXIS, NEXIS Library, BNAIED File.

25. See *Lori Gilmore, The Export of Nonhazardous Waste*, 19 ENVTL. L. 879 (1989).

26. *The Marine Protection, Research and Sanctuaries Act of 1972*, 33 U.S.C. § 1412(a) (1988); *Ocean Dumping Ban Act of 1988*, 33 U.S.C. §§ 1414b, 1414c; see also *John A. Guarascio, The Regulation of Ocean Dumping After City of New York v. Environmental Protection Agency*, 12 B.C. ENVTL. AFF. L. REV. 701 (1985); *Reitze & Davis, supra* note 17 (discussing advantages and disadvantages of landfilling, ocean dumping, deep well-injecting, and ocean incineration of hazardous waste).

While nonhazardous materials are not governed by these statutes, it is unlikely that large scale ocean dumping of nonhazardous waste will occur.

It appears that the only long term solution to the solid waste problem is to reduce the amount of waste. Recycling is probably the best known way to accomplish this goal. Most other waste reduction options hamper economic growth. Unfortunately, America is far behind other industrial nations in recycling efforts. Japan recycles more than 50% of its trash, while Western Europe recycles around 30%; the United States trails badly - around 10% is recycled.²⁷

Recycling has some obvious benefits. It saves energy and reduces air and water pollution, when compared with the use of virgin materials. One source estimates that recycling can reduce water pollution by 20%, and air pollution by 50%.²⁸ However, some commentators have criticized these numbers, noting a lack of serious total life cycle analysis,²⁹ because "recycling . . . may actually be more environmentally damaging than just doing nothing: what we save in solid waste in landfill may just be substituted by extra exhaust fumes as fleets of lorries carry waste packaging around, adding to global warming. Landfill replaced by airfill."³⁰

The goal of public policy should be to encourage recycling of products and packaging, while not unduly hampering economic growth. The ethical and practical case for promoting environmental health is strong; however, one cannot discount the ethical and practical importance of continued economic growth on increased human well-being. A proper balance between environmental protection and economic growth is a critical issue in modern industrial society. Either extreme is destructive. Economic growth without concern for the environment is ultimately self-destructive. Environmental protection without concern for its impact on economic growth condemns millions to poverty.

27. See, e.g., John Langone, *A Stinking Mess*, TIME, Jan. 2, 1989, at 47.

28. Perry, *supra* note 12, at 10G.

29. Brian W. Blunden, Developing Environmentally Acceptable Packaging, Address at the Financial Times Conference on International Packaging and the Environment (Mar. 23, 1992), at 6.1-4 (transcript available from Financial Times Conference Organization) [hereinafter Blunden, Fin. Times Conference]; see also Greg Neale, *How Recycling Can Harm the Environment*, SUNDAY TELEGRAPH, Oct. 25, 1992, at 15; Jonathan C. Sims, Packing and Packaging Waste Policies in the European Community, Address at the Financial Times Conference on International Packaging and the Environment (Mar. 23, 1992), at 7.1-7 [hereinafter Sims, Fin. Times Conference].

30. See Sims, Fin. Times Conference, *supra* note 29, at 7.7.

This debate has gone on for centuries. No-growth advocates like to discount the value of economic growth through a romantic vision of the unspoiled state of nature. However, for all its faults, modern industrial society has dramatically improved living standards, as measured by objective facts such as life expectancy.³¹ The proper path to pursue is continued economic growth within the limits set by environmental realities.³²

III. VOLUNTARY RECYCLING IN THE UNITED STATES

Currently, recycling efforts in the United States are largely voluntary patchwork. Efforts vary greatly. Some products are recycled in great amounts, others not at all.³³ Primarily, the United States recycles product packaging. Geographic differences also affect recycling activities. Most recycling efforts currently underway are located in the Northeastern states.

A. A Success Story: Aluminum Beverage Cans

A look at a recycling success story illustrates some critical issues. The true star of the recycling effort in the United States is aluminum.³⁴ Aluminum forms many metal alloys, all of which are hard and strong, but also ductile and light. These characteristics make aluminum ideal for many uses.

Manufacturers use aluminum metals extensively in both products (automobiles and aircraft) and product packaging (beverage cans). Aluminum began replacing its old rivals, steel and glass, in various uses during the last half century and has been recycled for the past two decades.³⁵ Initially, recycling efforts be-

31. See *The Heidelberg Appeal*, reprinted in *Beware of False Gods in Rio*, WALL ST. J., June 1, 1992, at A12 (call for balanced and scientifically sound environmental policy signed by 218 leading scientists from around world).

32. See, e.g., William D. Ruckelshaus, *Toward a Sustainable World: Government and Industry Policies Necessary for Sustained World Development*, SCI. AM., Sept. 1989, at 166; Emily T. Smith, *Growth v. Environment*, BUS. WK., May 11, 1992, at 66.

33. The recycling rate of packaging materials in the United States follows: Aluminum - 64%; Steel - 25%; Plastic - 1% to 30%; Glass - 20% to 30%; and Paperboard - 0% to 50%. The recycled content of packaging materials follow: Aluminum - 50% to 55%; Steel - under 10%; Plastic - almost none; Glass - 20% to 80%; and Paperboard - 30% to 100%. Dana Milbank, *Aluminum's Envious Rivals Turn Green, Rush to Show They, Too, Are Recyclable*, WALL ST. J., Sept. 18, 1991, at B1.

34. *Id.*

35. For more detailed information on aluminum recycling, see, e.g., Milbank, *supra* note 33, at B1; Geoffrey Dyer, *Saving Energy with Born-Again Beverage Cans*, FIN. TIMES, May 8, 1992, at 28; Kenneth Gooding, *Survey of Aluminum*, FIN. TIMES, Oct. 28, 1992, at 33; STILWELL ET AL., *supra* note 10, at 68-77; see also INTERNATIONAL TRADE CENTRE UNCTAD/GATT, EXPORT PACKAGING NOTE NO.

gan when states threatened regulation because of litter problems associated with aluminum beverage cans. The aluminum industry reacted by initiating recycling efforts before the threatened state regulations were initiated.³⁶

The aluminum industry developed a recycling program. Consumer-collection sites were established. These collection sites fed the aluminum recycling system. Currently, major aluminum companies operate hundreds of collection centers which pay consumers for used aluminum. Backed by an industry-funded publicity campaign, the centers take in enormous amounts of used aluminum cans. The used cans are shipped to recycling plants where they are converted into aluminum for new cans. The success of this system has been dramatic: in 1972 industry recycled aluminum cans at a rate of 15%; today the figure is 63%.

The aluminum industry has benefitted economically as well. Not only did more aluminum cans get recycled, but recycling costs dropped as the volume of cans recycled increased. This made aluminum more price competitive with steel and, as a result, the aluminum industry now dominates the beverage can market.

Aluminum became the star of the American recycling scene due to a combination of technical worth, industry efforts, and regulatory push. Aluminum enjoys technical advantages as a choice for recycling, because, in the beverage can area, aluminum re-

35, THE POTENTIAL IMPACT OF ENVIRONMENTAL LEGISLATION ON EXPORT PACKAGING FROM DEVELOPING COUNTRIES 6-8 (1991) (discussing various packaging materials) [hereinafter EXPORT PACKAGING NOTE].

36. The leaders in this effort were the aluminum giants like Alcoa and Reynolds, but success was not limited to existing aluminum manufacturers. Coors, a brewery and a user of aluminum packaging for its beers, entered the business of collecting aluminum cans and built a mini-mill to recycle aluminum in 1959. By 1993 Coors expects to be the sixth largest producer of aluminum in the nation. Although Coors' business is dwarfed by the industry leader, Alcoa, it is a testament to the success of aluminum recycling. Coors envisions enormous future growth as recycling expands beyond beverage cans to aluminum materials used in products like automobiles. Marj Charlier, *Adolph Coors Is Looking Beyond Beer for the Future*, WALL ST. J., Dec. 30, 1991, at B2; COORS BREWING CO., PRESS RELEASE (Oct. 26, 1992).

The steel industry attempted to hold share in the can packaging market by arguing that steel products were more likely to biodegrade. Technically, this is true. Steel, like other iron-containing materials, deteriorates, in the presence of water, through the process of oxidation, or rusting. The claims that steel is biodegradable pose another interesting issue: the validity of claims to environmental superiority of allegedly biodegradable materials. The truth is that many substances will degrade in the presence of water or light. However, in many landfills light and water are not present and materials decompose very slowly. Many commentators make the observation that almost no degradability occurs in landfills. See, e.g., STILWELL ET AL., *supra* note 10, at 106-07.

cycling is a closed loop process. A manufacturer makes cans of virgin aluminum, they are used, collected, and melted down. The recycled aluminum then becomes a new can and the process repeats itself. There is little waste and few steps in-between. This technical advantage, combined with the high price paid for scrap aluminum make it a perfect product for recycling. Regulation can drive up the price of scrap product, but it can do little to alter the technical advantages or disadvantages of recycling a product.

Additionally, willingness to cooperate, including the ease and convenience of recycling for consumers, must be considered.³⁷ While aluminum beverage cans are a recycling dream, aluminum foil is a good example of a recycling strategy that lacks ease and convenience for consumers. Aluminum foil and foil packaging are almost never recycled because consumers are reluctant to collect them. Foil gets wrinkled-up and messy in the kitchen. Consumers have not been willing to handle the mess. The high cost of converting scrap foil into new foil also impedes successful recycling efforts. Because of its light weight, the value of the aluminum foil scrap, and consequently the price that could be paid to consumers, is low. Individual consumers, boy scout troops, and others have little incentive to start aluminum foil collection drives.³⁸

B. Other Packaging Materials

Other industry efforts at recycling show varying degrees of success. Some materials, like steel, also have a successful record. Paper, glass, and plastics recycling currently show mixed results.

1. Steel

The steel industry has quietly been involved in recycling for years. It recycles two-thirds of all steel products, primarily: steel drums, rails, and other large steel products.³⁹ Steel packaging can also be recycled in a closed loop process, and the steel indus-

37. Consumers may be more difficult to affect by regulation. Consumers can be regulated by using either a "carrot" (creating a collection industry that pays for scrap or deposit laws), or a stick (banning, or charging for, disposal of certain items in municipal waste).

38. However, despite all these disadvantages, the aluminum industry is promoting recycling of foil. Kenneth Gooding, *Look for a Silver Lining - An Industry Where Recycling Strengthens the Bottom Line*, FIN. TIMES, Nov. 10, 1992, at IV.

39. STILWELL ET AL., *supra* note 10, at 92. The Steel Can Recycling Institute, 680 Anderson Drive, Pittsburgh, Pa., 15220, advertises that steel is "America's Most Recycled Material." See also Robert A. Froesch & Nicholas E. Gallopoulos, *Strategies for Manufacturing*, SCI. AM., Sept. 1989, at 144, 148.

try has opened recycling centers to compete with aluminum recycling centers. The steel industry's recycling centers collect not just steel; they also collect aluminum, glass, and paper.⁴⁰ Steel cans can be separated from aluminum cans by magnets. However, steel packaging often contains other metals, such as aluminum and tin, which reduce its value. This makes steel recycling less profitable than recycling aluminum. Nevertheless, given time and money, a program rivaling aluminum's is possible.

2. Paper

The paper industry recycled newspapers, even before the recycling success of the aluminum industry, and is currently expanding its recycling efforts. Many types of paper, such as newsprint and stationary, are recycled in significant quantities.

In 1991, the recycling rate for paper was about 34%, which the paper industry hopes to increase to 40% by 1995.⁴¹ Some paper products are recycled at even higher rates. For example, corrugated paper (for example, a cardboard box) is already recycled at a 57% rate.⁴² Nevertheless, paper - including packaging, newspapers, books, catalogs and other items - accounts for 50% of all the material in United States landfills. Newspapers alone take up 15% of the landfill space.⁴³ However, the future of paper recycling may be brighter, as demand for recycled paper ramps up.⁴⁴

Unfortunately, recycled paper also suffers from a distinct technical disadvantage. Recycled paper is of a lesser quality than virgin paper because: (1) its fibers are shorter and weaker than those of virgin paper, and (2) paper can only be recycled five to seven times without a degradation in quality.⁴⁵ However, technological breakthroughs may be on the horizon that would change

40. For a more detailed discussion of steel recycling, see STILWELL ET AL., *supra* note 10, at 77-80.

41. John D. Bence, Future Prospects for International Recycling, Address at the Financial Times Conference on International Packaging and the Environment (Mar. 23, 1992), at 10.4 (transcript available from Financial Times Conference Organization) [hereinafter Bence, Fin. Times Conference].

42. *Id.*

43. Frank E. Allen, *Piling Up: As Recycling Surges, Market for Materials Is Slow to Develop*, WALL ST. J., Jan. 17, 1992, at A1, A4; see also *Groups Urge Federal Legislation to Mandate Recycled Newsprint Use*, Daily Rep. for Executives (BNA) No. 219, at A1 (Nov. 12, 1992), available in LEXIS, NEXIS Library, DREXEC File.

44. See Scott Allen, *Paper Recycling: Growth Industry; Business Prepares for Tougher Rules*, BOSTON GLOBE, Oct. 22, 1992, at 65.

45. See STILWELL ET AL., *supra* note 10, at 47-55; Bence, Fin. Times Conference, *supra* note 41, at 10.6.

this situation.⁴⁶ Other economic disincentives to paper recycling include the low value of scrap paper and the high cost of machinery necessary to remove ink and other contaminants.

3. Glass

Glass packaging has declined because plastics have replaced glass in many packaging segments.⁴⁷ However, glass containers are still widely used. Food packaging represents 32% of the approximately 40 billion glass packaging units sold annually; beverage containers constitute 63%; the rest are used to hold drugs, cosmetics, or chemicals.⁴⁸ Glass packaging also benefits from its "quality" packaging image.⁴⁹

Glass containers, like aluminum cans, are completely recyclable and have respectable recycling rates and recycled content.⁵⁰ However, glass recycling, again, suffers because of its low scrap value. There are also other problems. Recycled glass must be sorted by color and type. Color sorting is required because different coloring agents in the glass are necessary to protect the container's contents from sunlight. Flat glass (windowpanes) must also be separated from container glass, because flat glass contains a higher calcia content.⁵¹

4. Plastics

The plastics industry has established several plastics recycling plants and also established groups to promote its recycling efforts. In 1991, plastics were recycled at a rate of approximately 11%, up from 4.3% in 1989, and the American Plastics Council has set an industry goal of recycling 25% of plastic bottles and rigid containers by 1995.⁵²

Plastic recycling rates vary substantially by the resin-type and use. Most resins are recycled in very small quantities. On the other hand, 24% of polyethylene terephthalate (PET) materials

46. See, Bence, Fin. Times Conference, *supra* note 41, at 10.4-10.7.

47. See Marcie Moskowitz, *Glass-to-Plastic Conversions: Are the Gravy Days Over?*, PLASTICS WORLD, Nov. 1991, at 48-52.

48. *Id.* at 48.

49. *Id.* at 50-51. Glass also dominates packaging categories which require "hot-fills" or oxygen barrier protection. *Id.*

50. STILWELL ET AL., *supra* note 10, at 57.

51. *Id.* at 55-60.

52. Emma Chynoweth & Elizabeth S. Kiesche, *Recycling in Fits and Starts*, CHEM. WK., Oct. 28, 1992, at 46.

were recycled in 1991.⁵³ The overall recycling rate for plastic soft drink bottles, most of which are made of PET, was 36% in 1991.⁵⁴

Polystyrene food-service products present a good example of industry efforts. In 1989 Mobil Chemical and Genpak Corp. opened the first commercial recycling plant for these products. The plant buys the waste from restaurants and schools, then cleans, grinds and reprocesses the waste into polystyrene pellets, which are then used to make a variety of new products. Several companies formed the National Polystyrene Recycling Council (NPRC), which hopes to recycle 25% of polystyrene food-service and packaging products by 1995.⁵⁵ This effort was necessary because several local municipalities have already banned polystyrene products.⁵⁶ McDonald's, the worlds largest fast-food restaurant chain, and a former major user of polystyrene products, has also announced a switch away from its use.⁵⁷

Many communities have also initiated efforts to collect plastic grocery and dry cleaning bags at local stores. An example is the program run by HEB Grocers. HEB collects plastic grocery bags at its 180 stores in Texas then ships them to Temple, Texas for recycling. HEB's program recycles 125 tons of plastic bags a year.⁵⁸

Economically, plastic recycling is a winner, because the value of plastic scrap is higher than glass, paper, or steel. Unfortunately, new plastic packaging is almost never made of recycled materials, since most plastics must be downgraded after recycling. Recyclers must often turn recycled plastic into lower grade plastic-containing products (carpet, building materials, and fillers) because different plastic polymers do not mix, bond, or ad-

53. JOHNSON CONTROLS, INC., PRESS RELEASE (May 22, 1992).

54. *U.S. Plastics Recycling Advanced Last Year, Industry Group Says*, WALL ST. J., June 2, 1992, at B11.

55. MOBIL CORP., MOBIL WORLD, Mar. 1991, at 14.

56. *North Bay: Fairfax Ok's Ban on Polystyrene Packages*, S.F. CHRON., May 14, 1992, at A13 (55 towns have banned polystyrene food containers); Chynoweth & Kiesche, *supra* note 52; *see also* STILWELL ET AL., *supra* note 10, at 226-34.

57. McDONALD'S, INC., 1991 ANNUAL REPORT at x (1992).

58. TEXAS WATER COMMISSION, CLEAN TEXAS 2000: HOME AND GARDEN ENVIRONMENTAL GUIDE 6 (1992). Another example is the "Pink Dot" program in Minneapolis, Minnesota. Ultra Pac, Inc., a local manufacturer and marketer of packaging made from 100% post-consumer PET plastics, has begun marking its products with pink dots. This aids consumers who since October 1991 have been able to place packaging bearing a pink dot into the city's curbside recycling collection service. ULTRA PAC, INC., PRESS RELEASE, NATION'S FIRST COLOR-CODED RECYCLING SYSTEM: PINK DOT IDENTIFIER PLASTIC RECYCLING PROGRAM (Oct. 16, 1991).

here well to each other.⁵⁹ This inability to mix plastic polymers makes the collection and sorting aspects of plastics recycling a nightmare. But, there are some solutions available.

The Society of the Plastics Industry developed a resin-coding system to assist in separating various plastic resins.⁶⁰ The system uses a symbol on the bottom of different plastic containers - the standard recycling emblem, arrows-chasing-arrows containing a number, which identifies the resin - in its center.⁶¹ If plastics are separated by type, they can be collected, washed and cleaned, chopped up, melted down, and then formed into pellets. The pellets can be sold as resin for use in production of new bottles or other products.⁶²

Sorting problems, coupled with the need to remove adhesives from labels and colors or other additives make plastic the most expensive material to process at materials recovery facilities.⁶³ The average processing costs per ton for commonly recycled materials follows: newspaper - \$33.59; mixed paper - \$36.76; corrugated boxes - \$42.99; mixed-color glass - \$50.02; steel cans - \$67.53; clear glass - \$72.76; green glass - \$87.38; amber glass - \$111.52; aluminum cans - \$143.41; PET plastic - \$183.84; and high density polyethylene plastic - \$187.95.⁶⁴

It seems the only way to significantly increase plastic recycling will be to manufacture products of single-resin materials. One example of this approach is Kraft's use of a mixture of re-

59. See, e.g., *Selling Green*, CONSUMER REP., Oct. 1991, at 688.

60. *Id.* The Society of the Plastics Industry, 1275 K Street N.W., Suite 400, Washington, D.C. 20005, developed a resin-coding system to assist consumers and recyclers to separate the various plastic resins. The system creates a symbol to be used on the bottom of different containers. The symbol is the standard recycling emblem, arrows-chasing-arrows, with a number in the center. The numbers identify the resin(s). 1. Polyethylene terephthalate (PET). This a frequently recycled resin and is currently used in large quantities in soft-drink containers. 2. High-density polyethylene (HDPE). This resin is also recycled in large quantities and is commonly used in milk and detergent jugs. 3. Polyvinyl chloride (PVC). Commonly used in shampoo and other consumer product bottles. This resin is rarely recycled and releases toxic gases if incinerated. 4. Low-density polyethylene (LDPE). This resin is rarely recycled. It is used in plastic film and wrap. 5. Polypropylene (PP). Again rarely recycled. Commonly used in food lids and containers. 6. Polystyrene (PS). Just beginning to be recycled, common in food containers, hot-drink cups, and other similar uses. 7. Mixed resins. All other resins that are rarely recycled. *Id.*

61. *Id.*

62. Faye Flam, *Putting a Lid on Throwaways*, CHEM. WK., July 25, 1990, at 33.

63. See *Study Says Market for Recyclables Hurt by Uneconomical Processing Costs*, Daily Rep. for Executives (BNA) No. 212, at A7 (Nov. 2, 1992), available in LEXIS, NEXIS Library, DREXEC File.

64. *Id.*

polymerized post-consumer PET and virgin PET in its new salad-dressing bottles.⁶⁵ The Kraft package is one of the first food packages to receive Food and Drug Administration (FDA) "no objection" status for the use of recycled materials.⁶⁶

C. Size Reduction and Other Approaches

Many consumer products companies are reducing the size of containers, and the amounts of packaging within those containers, to reduce waste.⁶⁷ Additionally, efforts to create biodegradable or even edible products continue.⁶⁸ Other waste reduction options include making simple products from ground garbage.⁶⁹ Alternatives such as incineration may also be feasible if they are used to burn materials that do not emit toxic fumes. While incinerators face strong NIMBY opposition, they must still be considered for disposal of both hazardous and nonhazardous waste because industry views incineration as a viable alternative to recycling.⁷⁰ More creative use could also be made of nontoxic land-

65. Marcie Moskowitz, *Salad-Dressing Bottles Go to Repolymerized PET*, PLASTICS WORLD, Dec. 1991, at 18. Proctor & Gamble also uses 100% recycled PET in its Spic'n Span containers. *Id.*

66. *Id.* In general, the FDA does not permit the use of recycled materials, based on the danger of contaminating food with materials, including potential toxins, that come in contact with post-consumer plastic wastes. Barry W. Overton, Recycling/Biodegradable Plastics, Address at the Financial Times Conference on International Packaging and the Environment (Mar. 23, 1992); Gérard Pré, Redesigning Packaging to Meet Trends in European Legislation - A Manufacturer's View, Address at the Financial Times Conference on International Packaging and the Environment (Mar. 23, 1992). The FDA regulates food packaging under its "food for human consumption" rules found at 21 C.F.R. §§ 100-197 (1992).

67. Proctor & Gamble reports up to 75% reductions in packaging materials for its Mr. Clean brands. PROCTOR & GAMBLE, INC., 1991 ANNUAL REPORT 3 (1992); see also *Selling Green*, *supra* note 59, at 687.

68. One source of waste is the use of plastic "peanuts" and other materials to fill containers and protect products during shipment. Some companies are substituting air-popped popcorn. While edible in name only, this substitute is a creative alternative. It is reminiscent of the no-waste practices of 19th century Chinese pottery traders who reportedly shipped their product in wooden crates packed with tea leaves. THE ECONOMIC PRESS, INC., BITS AND PIECES, Apr. 2, 1992, at 15.

69. A Japanese company, Thomas Ceramic, is able to take ground garbage of different materials, mix it with a cement-like powder, and create superhard ceramic bricks. Kubota Corporation has invented a method to take ash from garbage incinerators and create slag suitable for building roads. Roy Garner, *The Green Machine*, BUS. TOKYO, Sept. 1991, at 35-37.

70. See Frank E. Allen, *Some Incinerators Have Capacity to Burn*, WALL ST. J., Oct. 2, 1992, at B1. LEGO, the toy manufacturer, has moved to materials for its plastic trays that will not emit toxic fumes if incinerated. Marisa Cohen, *The Package Deal*, TOY & HOBBY WORLD, June 1991, at 49, 50 (presenting interesting look at efforts by leading toy manufacturers to improve environment, as well as

fills. For example, landfills could also be turned into usable lands for ski resorts or golf courses.

Along with recycling, all the above options should be considered. Landfills will always be necessary, but reducing our dependence on them would be beneficial.

D. Products

Recycling of the products themselves, microwave ovens for example, has proceeded at a slow pace. The initial barrier to recycling is presented by the problems associated with disassembly and sorting of all the product's component parts. Metals, plastics, glass, paper, and other materials used in a product could be recycled, but not in a closed loop system. Individual products would first have to be collected. Then they would have to be disassembled. Their component parts would have to be separated. This same process would have to be repeated again and again - until a material capable of being recycled was found. Only then could the recycling process start. Parts incapable of recycling, either technically or economically, would still have to be incinerated or disposed of in a landfill. Finally, the disassembled component parts would probably take up more space in a landfill once they were disassembled.

The automobile, its parts and fluids, present an interesting illustration. Some parts are currently being recycled. Motor oil is one product for which well-publicized efforts are underway. Several petroleum companies now offer this recycling service at their branded service centers.⁷¹ Oil recycling has also proven profitable. One gallon of waste oil yields 2.5 quarts of fresh oil, the same yield as 42 gallons of crude oil.⁷² Legislation has also prompted the recycling of automobile parts. Lead-acid car bat-

value of packaging in toy merchandising). A recent law review article calls for the use of incineration at sea for the treatment of hazardous waste. See Reitze & Davis, *supra* note 17. New advances in plasma-arc torch technology offer even greater promise than conventional incineration methods. Ruffenbach, *supra* note 14, at B4. Approximately 10% of municipal waste is incinerated nationally. State-by-state comparisons vary greatly. Connecticut (65%) and Massachusetts (48%) are the leading users of incinerators, while neighboring Rhode Island has recently banned the use of incineration. Scott Allen, *Initiative Backers Cite High Incineration Rate*, BOSTON GLOBE, Oct. 7, 1992, at 36.

71. Exxon began a publicity campaign in 1991. EXXON CORP., ADVERTISE-
 MENT (1991) (newspaper advertisement in author's possession). Mobil initiated
 a pilot program in 1990 and expanded the plan in 1991. MOBIL CORP., 1991
 ANNUAL REPORT 20 (1992).

72. Nicholas Basta & Ken Fouhy, *From the Waste Heap*, CHEM. ENGINEERING,
 Dec. 1991, at 23-29.

teries and air conditioning refrigerants (chlorofluorocarbons (CFCs)) are examples of automobile parts where disposal has been banned, prompting recycling efforts.⁷³ The automotive industry is trying to recycle waste tires, a highly visible waste product.⁷⁴ Although tire rubber cannot be easily depolymerized, and recovery of other tire component materials is difficult, waste tires are currently recycled to produce rubber additives in roadbed asphalt, carpet padding, floor tiles, and garden hoses.⁷⁵

New recycling techniques and technologies for automotive products continue to appear. First Brands Corp., the makers of the industry leading Prestone brand antifreeze, announced a new technology to recycle antifreeze last year. This breakthrough is significant because antifreeze is a toxic substance and many states are considering legislation to restrict its disposal.⁷⁶ First Brands believes that, like aluminum packaging, antifreeze recycling can be profitable and has established a subsidiary to create a nationwide collection network.⁷⁷

Perhaps someday recycling of most component parts from scrap automobiles will be feasible, but presently, recycling is primarily limited to the reuse of scrap metals. Nevertheless, industry-led technical innovations similar to those described above continue and will expand the horizons for recycling efforts.⁷⁸ For example, Ford, General Motors, and Chrysler formed the Vehicle Recycling Partnership in the United States to study manufacturing automobiles with a view toward recycling their materials.⁷⁹

73. See, e.g., Rick Whiting, *Time Is Running Out for CFC Users*, ELECTRONIC BUS., Sept. 1992, at 69-76; STILWELL, ET AL., *supra* note 10, at 186. Disposal of lead-acid batteries has been banned in several states. See, e.g., *Nebraska: Solid Waste Statute Imposes Landfill Fees, Bans Dumping of Batteries, Used Oil, Yard Waste*, Env't Rep. (BNA) No. 23, at 934 (July 24, 1992); *Missouri: Source Reduction Board Aims at Packaging in Effort to Meet Law's Landfill Restrictions*, Env't Rep. (BNA) No. 22, at 2710 (Apr. 10, 1992); *South Dakota: Governor Approves New Law to Limit Mining, Phase Out Landfill Disposal of Some Materials*, Env't Rep. (BNA) No. 22, at 2577 (Mar. 20, 1992). The 1990 Clean Air Act Amendments prohibit venting CFCs into the atmosphere and implement the Montreal Protocol, an international treaty with the same effect. 42 U.S.C. § 7671 (Supp. II 1990).

74. Americans throw away 234 million tires annually. We recycle approximately five million of these tires. See Perry, *supra* note 12, at 10G.

75. Basta & Fouhy, *supra* note 72, at 29; Perry, *supra* note 12, at 10G.

76. Kevin Pritchett, *First Brands Sets Recycling Plan for Antifreeze*, WALL ST. J., Feb. 27, 1992, at B5.

77. *Id.* First Brands envisions a \$200 million business in five years. *Id.*

78. Basta & Fouhy, *supra* note 72, at 29.

79. FORD MOTOR COMPANY, PRESS RELEASE (May 20, 1992). Ford also participates in a similar organization in Europe. *Id.* Ford has also established a pilot plant in Germany to study the idea of manufacturing automobiles with a view toward recycling its materials. *Id.*

Volkswagen, BMW, and Nissan have all set up pilot plants to investigate recycling options.⁸⁰ Other measures taken by automobile manufacturers to improve the recyclability of vehicles include: the development of improved tools to speed disassembly of vehicles, designs which incorporate recycled materials, and coding plastic parts.⁸¹

IV. REGULATORY ATTEMPTS TO ENCOURAGE RECYCLING

The voluntary efforts previously discussed are not entirely driven by enlightened corporate self-interests. As discussed above, many companies initiated recycling campaigns because they feared legislated recycling requirements for their products.⁸² Another industry fear is an imposed "recycled content" for their products.⁸³ These fears are justified, because legislatively mandated recycling, without a solid technical and economic basis is as risky as driving at night without your lights on. The wreckage that a legislative solution would inevitably bring is both avoidable and unnecessary.

Legislation should be enacted only after careful consideration of all the factors - environmental, technical, and economic. The recycling laboratories - other nations, individual states, and industry efforts - all provide data which must be reviewed and considered before any legislature imposes recycling regulations. Mandated recycling must properly balance the competing environmental, technical, and economic concerns. This section summarizes current data from international and national recycling laboratories.

A. Europe

Several nations in Europe have enacted environmental laws

80. VOLKSWAGEN AG, 1991 ANNUAL REPORT 53 (1992); Doron P. Levin, *Imperatives of Recycling Are Gaining on Detroit*, N.Y. TIMES, Sept. 6, 1992, § 4, at 12. BMW has opened three salvage centers in the United States where consumers can return BMWs for a \$500 credit towards the purchase of a new one. *Id.*

81. Levin, *supra* note 80, § 4, at 12. Current technology allows many car parts to be reused as replacement parts in other vehicles. Additionally, the remaining steel and aluminum parts of the vehicle can be sorted by magnetic methods. The most significant current problem is dealing with the plastics, glass, and other materials, collectively known in the industry as "fluff." *Id.*

82. For further discussion of this industry fear, see *supra* note 36 and accompanying text.

83. Minimum recycled content legislation would require that either the product, or its packaging, be produced with at least the legislatively specified amount of recycled material, rather than purely virgin material.

that mandate recycling. The recycling laws in Switzerland, the Netherlands, Germany, and France will be examined to illustrate the variety of foreign waste management regulation. While their laws began by focusing on beverage containers, these countries have since expanded recycling regulation to include all product packaging. However, each country has adopted different strategies to accomplish their individual recycling goals.

1. Switzerland

Switzerland's approach is to reduce the actual amount of packaging created and used.⁸⁴ The Swiss impose waste reduction targets instead of mandating recycling.⁸⁵ The Swiss approach views recycling as a means to an end: the actual reduction of waste.⁸⁶

2. The Netherlands

The Dutch have adopted "standstill" laws that will keep waste levels from increasing in the future. The Dutch adopted their National Environmental Policy Plan or Nationaal Milieubeleidsplan (NMP) in 1988.⁸⁷ The NMP set goals for packaging that included recycling, incineration, and landfill targets.⁸⁸ The original NMP targets were revised in 1990; the new NMP plan calls for 60% recycling, 40% incineration, and no landfilling.⁸⁹

In 1991, the Dutch government and leading industrial com-

84. *Issues: Environment - Update and Outlook on the EC Initiatives on Packaging and Packaging Waste*, THE INT'L BUS. ISSUES MONITOR, Monitor Bulletin No. 91-39, Aug. 14, 1991, at 1 app. at B4 [hereinafter Monitor Bulletin]; Intel Corp., *Packaging Laws in Europe 5* (unpublished report, on file with Villanova Environmental Law Journal) [hereinafter Intel Report].

85. Monitor Bulletin, *supra* note 84, at 1 app. at B4. The Swiss have imposed a "refillable or recyclable" requirement on beverage containers. Intel Report, *supra* note 84, at 5.

86. Recycling is just one way to prevent increased waste. Other options include reuse of the waste or conversion of the waste into an energy source. Reuse is limited to certain situations such as a bottle which can be refilled after the bottle is cleaned, the label removed, and the bottle sterilized. Energy conversion requires incineration, which poses air pollution issues, and suffers from a lack of market for the end product. Incineration, without energy conversion, only reduces solid waste.

87. Monitor Bulletin, *supra* note 84, at 1 app. at A5; see also *Germany, Netherlands Seen Leading Europe in Waste Minimization*, INTEGRATED WASTE MGMT., Jan. 8, 1992, at 1, available in LEXIS, NEXIS Library, IWM File. [hereinafter INTEGRATED WASTE MGMT.].

88. Monitor Bulletin, *supra* note 84, at 1 app. at A5-A7; INTEGRATED WASTE MGMT., *supra* note 87.

89. Monitor Bulletin, *supra* note 84, at 1 app. at A5.

panies agreed to a plan designed to reach the new NMP targets.⁹⁰ The combined pressures of government regulation, consumer demand, and retailer "delisting" convinced reluctant Dutch industries to agree to the new plan.⁹¹ This plan, known as the Dutch Covenant, contains a variety of elements including: (1) "stand-still" targets for total weight of packaging placed on the market; (2) recycling goals of 80% of one-way glass, 60% of paperboard, 50% of plastic bottles and film, and 75% of metal packaging; (3) "take-back" requirements on retailers and fillers; (4) the elimination by the year 2000 of landfilling or incineration without energy recovery; (5) limitations on incineration with energy recovery to 40% of the total waste; and (6) recycling efforts, including: increased use of bottle deposit requirements, curbside collection programs, and pilot programs to increase markets for recycled materials.⁹²

"Delisting" is a phenomena where retailers refuse to stock certain products containing allegedly hazardous materials (for example, polyvinyl chlorides (PVCs)), resulting in a de facto ban on those products.⁹³ The delisting phenomena has also been seen in Germany, Switzerland, and Scandinavia.⁹⁴ If, or when, "delisting" comes to America, its impact would be even greater because the United States is more dependent on large, nationwide distribution systems for food (grocery chains like American Stores, Safeway, A&P, and Food Lion) and consumer products (WalMart, Sears, K-Mart).

Maybe because of the delisting phenomenon, or else because of other international waste regulations, American retailers are paying more attention to the environment. In July 1990, Wal-Mart, the America's largest retailer, sent a letter to its suppliers calling for an increased use of recyclable packaging.⁹⁵ More recently, WalMart announced the creation of an "environmentally

90. *Id.*

91. *Id.* at 1 app. at A5-A7, B1; see Intel Report, *supra* note 84, at 9. For further discussion of delisting, see *infra* notes 93-97 and accompanying text.

92. Monitor Bulletin, *supra* note 84, at 1 app. at A5-A7.

93. *Id.* at 1 app. at B1; see Intel Report, *supra* note 84, at 9. PVCs are a common thermoplastic resin used in packaging and a wide variety of products. While most plastics are derived primarily from petroleum, PVCs are formed by a mixture of petroleum hydrocarbons and chlorine. PVCs are believed to release toxic substances such as dioxins and hydrogen chloride, a particular concern when PVC's are incinerated. STILWELL ET AL., *supra* note 10, at 65, 68.

94. Monitor Bulletin, *supra* note 84, at 1 app. at B1.

95. Kevin Helliker, *Wal-Mart Plans to Open a Prototype for Environmentally Sound Stores*, WALL. ST. J., June 8, 1992, at B5.

conscious" prototype store in Lawrence, Kansas.⁹⁶ The store will feature solar powered signs, recycling collection bins so that customers may remove packaging outside the store, and other "green" features.⁹⁷

3. Germany

The German government has an elaborate statutory scheme which is based on collection of materials. By July 1995, the German government plans to collect 90% of glass, steel, and aluminum packaging and 80% of all other packaging materials - most of which must be recycled.⁹⁸

Germany rejected "standstill" requirements. Instead it imposed "take-back" obligations on manufacturers or suppliers. The German system classifies packaging as either transportation, wrapping, or sales packaging.⁹⁹ Since 1992, suppliers have been required to "take-back" transportation packaging, such as pallets, crates, and boxes. Suppliers must also "take-back" all wrapping materials, such as blisters or foils, from retailers or consumers. In 1993, suppliers must begin to "take-back" all sales packaging materials after use, and landfilling of packaging materials will also be banned.¹⁰⁰

To meet the above requirements, German industry created the Dual System - a waste collection system exclusively for sales

96. *Id.*

97. *Id.*

98. The German packaging regulation, *Verpackungsverordnung*, went into effect on June 12, 1991. BGBl. I (English translation on file with Villanova Environmental Law Journal). This regulation is often called the Toepfer decree. Besides the statute itself, the major secondary sources on German law are Monitor Bulletin, *supra* note 84, at 1 app. at A1-A4, B1-B6; EXPORT PACKAGING NOTE, *supra* note 35, at 10-13 app. A; Ing Olaf Oelsen, Address at the Financial Times Conference on International Packaging and the Environment (Mar. 23, 1992), at 15.1-4 [hereinafter, Oelsen, Fin. Times Conference]; Clemens Stroetmann, German Packaging Legislation, Address at the Financial Times Conference on International Packaging and the Environment (Mar. 23, 1992) (transcript available from Financial Times Conference Organization) [hereinafter Stroetmann, Fin. Times Conference]; INTEGRATED WASTE MGMT. *supra* note 87; Intel Report, *supra* note 84, at 18-20; Interviews with industry sources; Frances Cairncross, *How Europe's Companies Reposition to Recycle*, HARV. BUS. REV., Mar.-Apr. 1992, at 34; John Pierson, *German Packaging Law May Set Precedent*, WALL ST. J., Mar. 17, 1992, at B1; Ramesh Juara, *Germany: Garbage Piling Up, Controversy Over How to Dispose of It*, INTER PRESS SERVICE, Mar. 10, 1992; Ferdinand Protzman, *A Nation's Recycling Law Puts Businesses on the Spot*, N.Y. TIMES, July 12, 1992, § 3, at 5 [hereinafter above sources are, collectively, GERMAN SECONDARY SOURCES].

99. For further discussion of the German system, see GERMAN SECONDARY SOURCES, *supra* note 98.

100. For further discussion of the German system, see GERMAN SECONDARY SOURCES, *supra* note 98.

packaging materials. A private company, Duales System Deutschland GmbH (DSD), was formed and granted a monopoly by the German government to collect sales packaging materials.¹⁰¹ DSD owns and operates a packaging collection system which services both retailers and consumers. DSD maintains a system of collection bins outside stores and in other locations. They collect sales packaging material from these bins and sell it to recyclers. The material placed in DSD's containers must be recyclable, so only products bearing a Gruen pÜnkst or "green spot" are handled.¹⁰² DSD grants "green spots" to companies whose packaging is certified to be recyclable.¹⁰³ After obtaining approval, and paying a fee, the company can use the symbol on its packaging.¹⁰⁴ Products which do not contain "green spots" are returned to the manufacturers.¹⁰⁵ As a practical matter, the "green spot" is becoming a market requirement and German retailers are increasingly requiring their suppliers to obtain DSD's "green spot."¹⁰⁶

Although the German system seems simple, it does have problems. Since DSD is a for-profit enterprise, deriving its revenue from fees and the sale of materials, it has little incentive to collect materials that it cannot resell. The plastics recycling infrastructure is even less developed in Germany than in the United States, making recycling of plastics even less attractive. In fact, there are stories circulating in Europe about German warehouses stacked to the rafters with sorted material for which there is no resale market. DSD has been exporting some of these materials to France and other countries where it is incinerated or disposed of some other way, which causes other problems.¹⁰⁷

101. Oelsen, Fin. Times Conference, *supra* note 98, at 15.1-4. A similar organization - the "RVT" (Gesellschaft zur Rücknahme und Verwertung von Transportverpackungen) - has recently been formed to "take-back" all types of transport packaging. Pierre J. Louis, *Shipping to Europe, Which Transport Pack?*, EUR. PACKAGING NEWSL. & WORLD REP., Oct. 1992, at 5.

102. Oelsen, Fin. Times Conference, *supra* note 98, at 15.1-4; Protzman, *supra* note 98, § 3, at 5.

103. Oelsen, Fin. Times Conference, *supra* note 98, at 15.1-4. A variety of institutes have been created to certify packaging as recyclable. Presently, paper, steel, and aluminum have been approved as recyclable. *Id.*

104. Oelsen, Fin. Times Conference, *supra* note 98, at 15.1-4; Protzman, *supra* note 98, § 3, at 5. DSD has reportedly been inflexible in permitting modifications to its standard licensing agreement. Author's interviews with numerous industry sources.

105. Oelsen, Fin. Times Conference, *supra* note 98, at 15.1-4; Protzman, *supra* note 98, § 3, at 5; Author's interviews with numerous industry sources.

106. See Stroetmann, Fin. Times Conference, *supra* note 98, at 2.1-5. By March 1992 over 4,000 companies had applied for approval. *Id.*, at 2.3.

107. See Pierre J. Louis, *Recycling or Not?*, EUR. PACKAGING NEWSL. & WORLD

Nevertheless, the German government is considering expansion of waste management laws beyond packaging. Draft legislation proposes to regulate electronic products themselves (computers, consumer electronics, appliances, toys, and watches).¹⁰⁸ International Business Machines, Inc. (IBM) and Digital Equipment Corporation (DEC) currently accept returned computers, while Hewlett-Packard and Siemens-Nixdorf are working to implement future, similar plans.¹⁰⁹ The draft law would require that sellers "take-back" consumers' old equipment - regardless of the brand - at the time of sale, and accept return of their own branded equipment at any time.¹¹⁰ Other European countries may even go beyond Germany's proposed "take-back product" approach.¹¹¹

4. France

France has adopted a lenient variation of the German system.¹¹² Landfilling of packaging materials is not banned; however, it is taxed sufficiently to limit usage. The French also created valorization (reuse, recycling, and incineration with en-

REP., Aug. 1992, at 1; *Waste: French Decree and Franco-German Decisions*, EUR. ENV'T, Sept. 8, 1992; *French, German Officials Agree on Measures Governing Transport of Hazardous Waste*, Int'l Env't Daily (BNA) (Sept. 4, 1992), available in LEXIS, NEXIS Library, BNAIED File; Sims, Fin. Times Conference, *supra* note 29 ("More resources are being spent transporting waste packaging around Germany, sorting it, recycling it, warehousing it and dumping it on other markets, than are being saved."); John Thornhill, *Dilemmas of the Overloaded Dustbin*, FIN. TIMES, Nov. 10, 1992, at III. For DSD's view, see Oelsen, Fin. Times Conference, *supra* note 98, at 15.1-4.

108. Laurence Hooper, *The PC PC: Computer Industry Comes Under Pressure to Recycle Old Gear*, WALL ST. J. (EUR. ED.), Vol. X, No. 34, at A1; *Reuse It or Lose It, Electronics Manufacturers Are Told*, ELECTRONICS, Feb. 1992, at 14. According to industry sources, the primary contents of a computer system in order of composition are: iron, copper, plastics, glass, aluminum, rare metal, heavy metal, and miscellaneous materials. Other electronics products contain similar materials.

109. For an interesting discussion of these plans to deal with recycling issues, see Barbara N. Berkman, *European Electronics Goes Green*, ELECTRONIC BUS., Aug. 19, 1991, at 50.

110. Bradford S. Gentry, *Packaging and the Environment - The Legal and Business Implications*, Address at the Financial Times Conference on International Packaging and the Environment (Mar. 23, 1992), at 3.1, 3.3-4.

111. A bill, known as the Testa bill, has been introduced in the Italian Parliament that would impose take-back requirements on makers of major appliances and personal computers. *Parliament to Consider Major Overhaul of Waste Disposal, Treatment Provisions*, Int'l Env't Daily (BNA) (Nov. 24, 1992), available in LEXIS, NEXIS Library, BNAIED File.

112. For further discussion of French law, see Intel Report, *supra* note 84, at 11-13; Monitor Bulletin, *supra* note 84 at 1 app. at B1-B6; Pierre J. Louis, *Packaging Trends in France*, EUR. PACKAGING NEWSL. & WORLD REP., Mar. 1992, at 1-3.

ergy production) targets.¹¹³ The current goal is 75% valorization by the year 2000.

A "take-back" obligation similar to that imposed in Germany will also be imposed, but the French rejected Germany's dual system of waste collection.¹¹⁴ Instead, the French will subsidize their local municipalities' efforts to collect and recycle through a tax or fee on industry. The French government is also encouraging industry to recycle the waste materials collected and sorted by its municipalities.¹¹⁵

5. *European Community*

The European Community (EC) is working to create laws that can unite the various national systems currently in place in Europe. In June 1992, the EC Commission introduced a proposed directive¹¹⁶ on packaging waste which was intended to create greater uniformity and remove barriers to the free movement of goods within Europe.¹¹⁷ This directive proposed recycling as the preferred way to reduce waste. Recovery targets were established, and "take-back" or other return and management systems for packaging waste were also proposed.¹¹⁸ Standardized material coding, assistance in the creation of information systems, and

113. France's acceptance of incineration with energy recovery is in contrast to the positions of many European countries. The allowance of incineration is important for the plastics industry since these hydro-carbon based materials are ideal for energy recovery.

114. Only packaging containing a "blue spot" will be collected, all other packaging must be returned to the manufacturer. A government ministry will grant the right to use the "blue spot."

115. The French have formed the Eco Emballage, an organization similar to Germany's DSD. Eco Emballage has been financed initially through fees collected by the French government on companies that bring packaging into the French market. Most companies are expected to join, although some may instead develop private plans to recover packaging. *Minister Signs Decree to Authorize New Packaging Waste Recovery Company*, Int'l Env't Daily (BNA) (Oct. 27, 1992), available in LEXIS, NEXIS Library, BNAIED File; *French Recycling Initiatives Launched*, BUS. EUR., Oct. 23, 1992, at 4.

116. The directive's legal basis is Article 100A which controls free movement of goods between member countries. EC Committee, Explanatory Memorandum 6B from EC Committee Draft Proposal on Waste Regulations (Dec. 18, 1991) (on file with author). Article 100A seeks harmonization of national legislation to promote free movement of trade. 2 Common Mkt. Rep. (CCH) ¶ 3302 (analyzing Article 100A).

117. Thornhill, *supra* note 107, at III; EC Environment, Health & Safety Subcommittee, Draft Proposal for a Council Directive on Packaging and Packaging Waste, Final Draft, DG XI-A4, dated 21/2/1992 (May 4, 1992) (position paper, on file with Villanova Environmental Law Journal) [hereinafter Position Paper].

118. Position Paper, *supra* note 117, at 2, 4-5; see Thornhill, *supra* note 107, at III.

consumer education were also included.¹¹⁹ The EC goal is to remove 90% of all packaging waste by weight within ten years and recycle 60% of each type of packaging material.¹²⁰

Creating one system to cover all European waste management is obviously a difficult political task. The differences in the various national schemes, as illustrated above, are large.¹²¹ The major political battle is being fought between the aggressive waste reduction nations, primarily in Northern Europe, and those nations emphasizing a need for industrial growth, primarily in Southern Europe. Nevertheless, there are enormous pressures to move towards a common system and the proposed EC directive is expected to be supported by industry, which seeks relief from the mix of varying national schemes.

However, a rival scheme is also developing, based on collaboration between France and Germany. Both countries have agreed to recognize the other's packaging collection system.¹²²

119. Position Paper, *supra* note 117, at 2, 4, 6, 9; see Thornhill, *supra* note 107, at III.

120. Thornhill, *supra* note 107, at III.

121. A brief summary of these measures includes: 1. *Bans*. Switzerland has banned PVC. The Dutch merchants have "delisted" PVC products as well. Sweden is implementing a phased-in ban on nonrefillable PET bottles, and the Dutch ban soft drink cans. 2. *Refillables*. Germany, Luxembourg, Belgium, and the Netherlands impose requirements designed to maintain dominant market share for refillable bottles. 3. *Mandatory deposits*. Many countries have adopted, or are considering mandatory deposit laws on various types of bottles and cans. 4. *Take-Back*. Germany, France, Austria, and the Netherlands have adopted "take-back" requirements. Belgium and Italy are considering similar legislation. 5. *Recycling targets*. The German, French, and Dutch targets have been discussed. Italy (50% of glass and metal beverage containers, and 40% of plastic drink bottles, to be recycled by January 1993), Belgium (collection target of 70% by 2000, with 80% of glass and metals and 60% of plastics and paperboard recycled), United Kingdom (50% of non-putrescible household waste to be recycled by the year 2000), and Austria (refillable market share restrictions protect recycled products as well) have also enacted targets. 6. *Standstills*. The Dutch and Swiss have enacted limits on packaging volume. 7. *Waste disposal*. Germany and the Netherlands are moving towards bans on landfilling. France is using taxation to discourage landfilling. 8. *Waste collection*. The Dutch Covenant, the German Dual System, and the French system all represent variations of these plans. Italy has imposed a recycling levy on plastic beverage containers to fund waste collection and recycling. The United Kingdom is granting financial credits to recyclers of waste. Monitor Bulletin, *supra* note 84, app. B; Intel Report, *supra* note 84, at 1-20.

122. Pierre J. Louis, *Packaging Waste in the Unified Europe*, EUR. PACKAGING NEWSL. & WORLD REP., Aug. 1992, at 1, 2. The German DSD will accept French approved packaging and the French Eco Emballage will reciprocate by accepting German approved packaging. The French will likely adopt as its "Blue Spot" symbol, the same graphic as the German "Green Spot": a circle containing an arrow moving clock-wise and curving towards the center of the circle. Both countries will likely permit manufacturers to ignore the need for blue or green

Cooperation between these two influential countries might force the EC to adopt a system based on the German-French model.¹²³ In fact, Germany has challenged the EC directive, arguing that national schemes should be permitted to exceed the requirements of the directive.¹²⁴

B. United States

Federal law has essentially ignored the issue of waste reduction, focusing instead on the licensing of landfills and incinerators, and the clean-up of hazardous waste sites. However, statehouses and local communities have been far from quiet.

1. State Level Regulation

Several states are beginning to consider, and sometimes enact, legislation designed to encourage recycling. The most obvious examples are bottle deposit laws enacted in several states. These deposit laws have increased bottle return rates to between 80% and 95% in enacting states.¹²⁵ Additionally, collection and

color schemes and allow them to coordinate the symbol with their package design. *Id.*

123. *Id.*

124. See Francis Cairncross, *Environmental Barriers Going Up as EC Takes Trade Barriers Down*, FINANCIER, Sept. 1990, at 16; *European Ministers Agree on Waste Shipment Regulations*, Int'l Env't Daily (BNA) (Oct. 16, 1992), available in LEXIS, NEXIS Library, BNAIED File. Technically, this requires changing the basis of the directive from Article 100A to Article 100S (governing pure environmental legislation, exempt from Article 100A requirements of free movement of goods). This would require unanimous approval. 2 Common Mkt. Rep. (CCH) ¶ 4175 (analyzing Article 100S). Meanwhile, Austria has recently adopted a decree similar to the German packaging regulation scheme. The Austrian system sets recovery targets, imposes take-back requirements, and forces industry to create a collection system. *Decree Requires Mandatory Recycling of Packaging Materials in Late 1993*, Int'l Env't Daily (BNA) (Oct. 14, 1992), available in LEXIS, NEXIS Library, BNAIED File.

125. James Firebrace, *Redesigning Packaging to Meet Trends in European Legislation - A Consumer's View*, Address at the Financial Times Conference on International Packaging and the Environment (Mar. 23, 1992), at 14.1-4 (incorrectly titled in article). See generally EXPORT PACKAGING NOTE, *supra* note 35, at 18-19 (brief categorization of state initiatives). There are many other examples. Several states have passed legislation requiring the use of recyclable materials in beverage containers. *Id.*

Other states have gone further and required that packaging containers and certain products consist of at least a minimum percentage of recycled material. Wisconsin requires that plastic bottles, cans, jars, or cartons contain 10% recycled material by 1995. WIS. STAT. ANN. § 100.297 (West Supp. 1992). Oregon has enacted an even broader statute that imposes minimum recycled material content requirements on rigid plastic containers (25% by 1995), glass containers (35% by 1995 and 50% by 2000), phone directories (25% by 1995, 15% of which must be post-consumer waste) and newsprint (75% by 1995). OR. REV. STAT. §§ 459A.500-.740 (1991).

sorting activities, both voluntary and involuntary, exist in local communities across the country. One source estimates that 3,500 local curbside collection programs reach 15 million households in this country.¹²⁶

Many local communities require separation of trash. For example, most Northeastern communities require sorting of garbage by type.¹²⁷ Others communities create incentives for recycling by imposing charges for nonrecycleable or unseparated trash.¹²⁸ Others seek to encourage and promote voluntary efforts. Consumers separate their trash into recyclable categories (glass, plastic, newspaper, etc.) and municipal collection facilities are provided which supply the collected materials to recyclers.¹²⁹ However, most states are still studying the issue and limit their regulation to: (1) the establishment of commissions; (2) public education; or (3) procurement guidelines for state agencies which

Finally, four states have passed laws that support recycling by requiring the use of single materials in packaging. Mississippi and several other states require resin coding of rigid plastic containers. *See, e.g.*, Mississippi Comprehensive Multimedia Waste Minimization Act of 1990. 1991 Miss. Laws 494, § 4 (codified as amended at Miss. CODE ANN. § 49-31-17 (Supp. 1991)). California has also enacted "single material" legislation to promote glass recycling by prohibiting beverage or food containers made of glass that contains ceramic materials. *See* The Clean Glass Recycling Act, 1990 Cal. Stat. 879, § 2 (codified at CAL. PUB. RES. CODE §§ 70000-70031 (West Supp. 1993)).

126. Allen, *supra* note 43, at A1. Additionally, many companies collect recyclable products at the office. *Id.* One community, Pittston, Pennsylvania, has a curbside collection program for recycling 11 different categories of materials. PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES, BUY RECYCLED GUIDE 4 (1992). Many communities have created voluntary programs; unfortunately, progress is slow. For example, Dallas had planned to offer voluntary recycling to its citizens. The city had contracted with a private recycler to provide source separated curbside collection. Consumers would finance the program by paying a small charge (less than four dollars per month). The recycler would collect No. 1 (PET) and No. 2 (HDPE) plastics; clear, brown, and green glass; aluminum; newspapers; and steel cans. Perry, *supra* note 12, at 6G. But when the city sought to sign up customers in a few pilot neighborhoods, there was insufficient customer participation. The program has, at least for now, been canceled. Dusty Rhodes, *Recycling Redux*, DALLAS OBSERVER, July 30, 1992, at 9.

127. STILWELL ET AL., *supra* note 10, at 5 (80% of households offered curbside collection of sorted garbage are in Northeast).

128. *See, e.g.*, Sam Libby, *Trash Fees by the Bag Keep the Lid on Taxes*, N.Y. TIMES, Nov. 22, 1992, at 4 (detailing efforts in Connecticut towns). These schemes generally include requiring standard-sized garbage bags or cans, fees charged according to the number of containers used, weighing the households' garbage then charging by the pound, or selling stickers and only taking marked containers. *Id.*

129. An example is the Oregon Reuse and Recycling Act, OR. REV. STAT. §§ 459A.005-.785 (1991), that provides for curbside collection of source-separated materials, recycling depots at collection centers and education of consumers. *See also* Lorie Parker, *Oregon's Pioneering Recycling Act*, 15 ENVTL. L. 387 (1985).

require increased purchases of recycled materials.¹³⁰

Some states have also imposed recycled-content laws for selected products and packaging, such as newsprint and trash bags.¹³¹ Others are attempting to force recycling by banning landfill disposal of batteries, some types of yard waste, and disposable diapers.¹³²

This article examines the details of four state initiatives that use different recycling and waste control techniques: (1) Minnesota's battery disposal plan; (2) Massachusetts' proposed packaging regulations; (3) the Coalition of Northeastern Governors' (CONEG) packaging waste reduction plan; and (4) Florida's innovative procurement plan. The Minnesota law, although applying only to rechargeable batteries, borrows from the "take-back" and waste collection schemes seen in countries like Germany. The proposed Massachusetts plan borrows from the use of recycling targets adopted by many European countries. The CONEG plan focuses on waste reduction and seeks voluntary cooperation from industry. Florida's plan offers a market-oriented alternative designed to create a recycling infrastructure.

a. Minnesota

States other than Minnesota also have legislation which bans the disposal of certain types of batteries or battery packs in landfills.¹³³ This "battery ban" legislation is primarily intended to reduce the levels of heavy metal contamination in landfills.¹³⁴

130. See, e.g., Preston & DeRose, *supra* note 11 (discussing Florida recycling law).

131. For a discussion of the impact of these regulations on the plastic bag industry, see James J. Callari, *New Bags Are Full of Trash*, PLASTICS WORLD, Nov. 1991, at 40-45.

132. The battery laws are discussed *infra* in notes 133-40 and accompanying text. Since disposable diapers account for 1-2% of landfill volume in the United States, states are considering bans on their disposal, forcing diaper makers - Proctor & Gamble and Kimberly Clark - to develop biodegradable diapers that can be composted. See Zach Schiller, *P&G Tries Hauling Itself Out of America's Trash Heap*, BUS. WK., Apr. 23, 1990, at 101; Doug Smock, *New Material for Diaper Covers in the Works at P&G*, PLASTICS WORLD, Dec. 1991, at 12-13. Finally, at least 12 states, and various municipalities, have banned some types of yard waste from disposal in landfills. Michael Precker, *Lawn and Order*, DALLAS MORNING NEWS, Oct. 21, 1992, at C1.

133. See, e.g., New Jersey Dry Cell Battery Management Act, N.J. STAT. ANN. §§ 13:1E-99.59 to .81 (West Supp. 1992); Rhode Island Dry Cell Battery Control Act, 1992 R.I. Pub. Laws 359.

134. Jacqueline Damian, *NiCad Batteries: Finding a Nontoxic Substitute*, ELECTRONICS, July 1991, at 50; *Batteries: Disposable or Rechargeable*, CONSUMER REP., Nov. 1991, at 720-21. Heavy metals - mercury, lead, cadmium, and chromium - are believed to pose serious hazards to the environment and to human health,

These same states have also enacted labelling and removeability requirements that allow consumers to participate in recycling programs.¹³⁵ The major nickel-cadmium (NiCd) battery manufacturers have started recycling programs.¹³⁶ Like the aluminum industry, battery manufacturers believe recycling can be profitable because the cadmium and nickel can be reused in new batteries.¹³⁷

Minnesota has gone one step further by placing the entire burden of collection and then either disposal or recycling on the battery industry. In 1991, Minnesota passed legislation that requires manufacturers of NiCd batteries and products containing NiCd batteries to create a pilot collection program for these batteries.¹³⁸ Plans for the recycling programs were due from the manufacturers in early 1992, and a mandatory program is to be imposed in 1994.¹³⁹ The NiCd battery industry formed a trade association, the Portable Rechargeable Battery Association (PRBA), which developed a pilot collection program and submitted it for state approval.¹⁴⁰

because they do not break down into less harmful constituents, rather they persist in the environment. Exposure to these metals has been linked to cancer, kidney, liver and lung disease, and a variety of other serious ailments. 138 CONG. REC. S5282 (daily ed. Apr. 9, 1992) (statement of Sen. Lautenberg); see also Bob Davis, *What Price Safety?*, WALL ST. J., Aug. 6, 1992, at A1 (identifying dispute over safety risk posed by cadmium). Cadmium is one heavy metal that legislators are trying to remove from the waste stream. Rechargeable batteries, for consumer electronics, tools, and computer products often contain cadmium.

135. For further discussion of these requirements, see *supra* notes 133-34.

136. When the author attended the 1992 Winter Consumer Electronics Show in Las Vegas, Nevada, he noticed several manufacturers of rechargeable NiCd batteries advertising and promoting their recycling programs. For example, Saft America Inc. has an 800 number which consumers can call for information. Customers can also send spent NiCd batteries to a collection center in North Carolina, from which Saft ships the batteries to its processing facility in Sweden. Gates and Sanyo have similar programs.

137. Representatives of Saft, Sanyo, and Gates all spoke with the author at the 1992 Winter Consumer Electronics Show. They all expressed similar thoughts on the potential profitability of NiCd recycling.

138. 1991 MINN. LAWS CH. 257, § 1, at 3-6 (amending MINN. STAT. §§ 115A.9155, 325E.125 (1991)). This is similar to actions taken with regard to all batteries, not just rechargeables, in Switzerland. The Swiss began with a ban on dumping batteries in landfills in 1986. They enacted a take-back scheme in 1989. Today, the Swiss government is aggressively supporting an attempt by an industry consortium to construct a massive battery recycling facility in Thun, Switzerland. See Ian Rodger, *Business and the Environment: Charged Up in the Alps - The Recent Opening of the World's First Household Battery Recycling Plant*, FIN. TIMES, Nov. 18, 1992, at 16.

139. 1991 Minn. Laws ch. 257, § 1, at 3-6 (amending MINN. STAT. §§ 115A.9155, 325E.125 (1991)).

140. PRBA was founded by five leading NiCd battery manufacturers: Gates, Panasonic, Saft, Sanyo, and Varta. Since its formation a variety of "bat-

It appears Minnesota's legislature bet that industry, in order to recover at least some of its collection costs, would choose to recycle. Minnesota's legislation succeeded because recycling NiCd batteries is profitable.

b. Massachusetts

In contrast with Minnesota's apparently successful battery recycling legislation, Massachusetts experienced many problems enacting broader recycling legislation. The problems were technical, economic, and political. A summary of Massachusetts' experiences follows.

Almost all Massachusetts local communities require consumers to separate their garbage into its recyclable components; in fact, all but seven Massachusetts cities or towns currently have recycling programs.¹⁴¹ Unfortunately, lack of demand for recycling material causes much of this carefully separated trash to end up recombined in landfills or incinerators.¹⁴² The Massachusetts Public Interest Research Group (MassPIRG), seeking to expand the market for recycled materials, and solve a perceived environmental problem, drafted legislation which sought to impose recycling requirements on the packaging industry.¹⁴³

MassPIRG's proposal required that all packaging used in Massachusetts be reusable, or contain recycled or recyclable material. Specifically, the proposal set a July 1996 deadline, after which all packaging that is not either: (1) reusable (a minimum of

tery-using" product manufacturers have joined. Included are manufacturers of: telephones (AT&T and Motorola), audio and video equipment (JVC, Sony, and Philips), appliances (Braun, Norelco, Hoover, and Teledyne), cameras (Fuji and Nikon), tools (Skil, Makita, Black & Decker, Poulan), and computers and other consumer electronics products (Sharp, Hitachi, and Tandy). PRBA drafted and submitted a proposal to the State of Minnesota in December 1991. The proposal sponsors the collection of batteries using four methods: retail collection, return by mail, rural drop-off collection programs, and curbside pick-up. PRBA also plans to sponsor education and advertising support for the program to encourage consumer participation. Data provided by the Portable Rechargeable Battery Association (PRBA), 1000 Parkwood Cir., Ste. 430, Atlanta, Georgia 30339.

141. See Scott Allen, *Question 3 Backers to Push Case on Hill*, BOSTON GLOBE, Nov. 5, 1992, at 43. Massachusetts' stated goals were: recycling 23% of its municipal solid waste in 1992, with an increase to 50% in 2000. *Id.*

142. Scott Allen, *High Supply, Low Demand Hurt Effort to Recycle*, BOSTON GLOBE, Aug. 30, 1992, at 27.

143. See Allen, *Some Incinerators Have Capacity to Burn*, *supra* note 70, at B1; Allen, *High Supply*, *supra* note 142, at 27. The PIRG proposal was introduced by Rep. Mark Roosevelt into the Massachusetts House of Representatives as Mass. H. 5202. Scott Allen, *Sparks Fly on Packaging Question*, BOSTON GLOBE, Oct. 28, 1992, at 1.

five times); (2) made of at least fifty percent recycled material; or (3) made of materials for which the statewide recycling rate exceeded thirty-five percent (increasing to sixty-five percent by the year 2006), would be banned from the state.¹⁴⁴ Naturally, the packaging industry lobbied against the bill and some members of the legislature drafted a watered down version of the MassPIRG bill.¹⁴⁵ Even so, the watered down version would have created the following recycling rate and content requirements - by 1996, 25% of all packaging in Massachusetts would come from recycled material, and that total would rise to 50% in 2002.¹⁴⁶ The Massachusetts House of Representatives passed the revised bill, which was also endorsed by the Republican governor, William Weld.¹⁴⁷ However, the bill failed to garner sufficient support in the Massachusetts Senate.¹⁴⁸

Unhappy with this defeat, MassPIRG successfully collected enough signatures to put their bill up for public referendum on the 1992 ballot.¹⁴⁹ While Governor Weld expressed support for Referendum Question No. 3,¹⁵⁰ a coalition of national trade associations and local corporations mounted another major effort to defeat the referendum.¹⁵¹ The referendum debate gathered

144. Anne M. Kelly, *Legislative Panel Approves Recycling Bill*, BOSTON GLOBE, Oct. 1, 1991, at 2.

145. *House Approves Measure to Require Recycled, Recyclable Packaging in State*, Env't Rep. (BNA) No. 31, at 1840 (Nov. 29, 1991); see also Kelly, *supra* note 144, at 2; David Stipp, *Massachusetts Business Groups Propose a Broad Recycling and Packaging Law*, WALL ST. J., Sept. 18, 1991, at B7; Robert L. Turner, *Weld's Recycling Problem*, BOSTON GLOBE, Nov. 14, 1991, at 15; *Recycling in the Marketplace*, BOSTON GLOBE, Dec. 17, 1991, at 22.

146. See *supra* note 145.

147. See *supra* note 145.

148. See *supra* note 145.

149. *Legislative Committee Backs Recycling Bill*, PROVIDENCE J. BULL., July 16, 1992, at B3. An unsuccessful legal challenge was mounted against the referendum process by which one of the other issues was placed on the ballot. All four issues on the ballot shared the same alleged process defect. See, e.g., Peter J. Howe, *Plea to SJC Over Ballot Process Created Odd Couples*, BOSTON GLOBE, May 21, 1992 at 39; Peter J. Howe, *Experts Question Petition Challenge*, BOSTON GLOBE, May 19, 1992, at 30.

150. Frank Phillips, *Governor Says Question 3 Passage Would Help, Not Hinder, Businesses*, BOSTON GLOBE, Oct. 30, 1992, at 26 (stating Weld claims proposal will create new jobs); *Report Spotlights Need for Recycling*, BOSTON GLOBE, Oct. 2, 1992, at 77; Gerard F. Russell & Ross Gelbspan, *Weld Signs Water Measure*, BOSTON GLOBE, Aug. 26, 1992, at 69; Turner, *supra* note 145; Joan Vennochi, *Greenhouse Effect*, BOSTON GLOBE, Aug. 26, 1992, at 69 (reporting backers claim that if Weld backs it, proposal can't be bad for business).

151. *\$6.9 Million Spent to Fight Question 1*, BOSTON GLOBE, Nov. 6, 1992, at 31 (reporting "No on 3" committee spent \$5.5 million in fight against packaging standards); Allen, *Sparks Fly*, *supra* note 143, at 1 (Rep. Roosevelt claims that "No on 3" committee is funded primarily by oil, chemical, and plastics compa-

heavy regional media attention.¹⁵²

Finally, on November 3, 1992, the Massachusetts voters rejected the referendum question by a substantial margin - 59% to 41%.¹⁵³ The decisive margin surprised many observers.¹⁵⁴ Despite their recent defeat, MassPIRG and the Governor plan to bring the issue back to the legislature.¹⁵⁵

c. CONEG

CONEG is the acronym for the Coalition of Northeastern Governors.¹⁵⁶ CONEG seeks to develop regional solutions for environmental problems amongst the New England states, New

nies; article notes that others such as Massachusetts Food Association, Mass. AFL-CIO, Massachusetts Restaurant Association, and dozens of local companies support committee); *Report Spotlights Need for Recycling*, *supra* note 150, at 77; Vennochi, *supra* note 150, at 69; ("No on 3" committee included Raytheon, Gillette, and Ocean Spray).

152. The *Boston Globe* provided detailed coverage, including an editorial endorsement of the referendum question. *On the Questions*, BOSTON GLOBE, Oct. 28, 1992, at 16 (urging "Yes" vote, citing need to create demand for recycled materials); *see also* Allen, *Question 3 Backers*, *supra* note 141, at 36 (citing state's dependence on incineration as reason for passage); Allen, *Sparks Fly*, *supra* note 143, at 1 (citing arguments for both sides); Scott Allen, *Effect of Question 3 Hard to Wrap Up, Data Show*, BOSTON GLOBE, Oct. 24, 1992, at 1 (finding impact greatest on plastics and some paper products); Scott Allen, *High Supply, Low Demand Hurt Effort to Recycle*, BOSTON GLOBE, Aug. 30, 1992, at B27; Peter J. Howe, *Kennedy Renews Call for Question 3*, BOSTON GLOBE, Oct. 31, 1992, at 17 (Joseph P. Kennedy 2d endorses Question 3). Other regional papers also provided coverage. *See, e.g., Bay State Tries to Lead in Recycling*, HARTFORD COURANT, Oct. 29, 1992, at C14 (supporting passage of Question 3); Mark Trumball, *Sparks Fly in Massachusetts Over Broad Recycling Plan*, CHRISTIAN SCI. MONITOR, Oct. 27, 1992, at 8.

153. Robert Reinhold, *The 1992 Elections: The States - the Ballot Issues*, N.Y. TIMES, Nov. 5, 1992, at B8.

154. Support for the referendum question had eroded over the course of the campaign. A survey taken in April 1992 indicated 83% support for recycling legislation. A mid-campaign survey taken Oct. 15-16 showed support for Question 3 at 55%. Allen, *Sparks Fly*, *supra* note 143, at 1; *see also* Allen, *Question 3 Backers*, *supra* note 141, at 36 (reporting "unexpectedly strong rejection" as massive television ad campaign evaporated early support).

155. Allen, *Question 3 Backers*, *supra* note 141, at 36. At least for the time being, Oregon remains the leader in broad-scoped recycling legislation. Their law sets recycling content requirements for selected products, including glass containers, rigid plastic containers, telephone books, and newsprint. *See supra* note 125 for a description of the Oregon statute's requirements. Massachusetts remains a leader with an extensive curbside collection program, aggressive use of incineration, statewide recycling goals, and effective April 1992 a ban on glass, metal, and aluminum containers in state landfills and incinerators. *See Allen, Question 3 Backers*, *supra* note 141, at 36.

156. Additional information on CONEG may be obtained by writing to: Coalition of Northeastern Governors, 400 N. Capitol St., NW, Washington, D.C. 20001.

York, New Jersey, and Pennsylvania. CONEG has staff in Washington and welcomes industry participation in its actions.

CONEG works through a combination of state regulation and voluntary efforts, with remarkable success. Their initial regulatory effort - The Model Toxics in Packaging Legislation - created a multi-year timetable for the virtual phase-out of lead, mercury, cadmium, and hexavalent chromium in packaging.¹⁵⁷ This model recognized that one of the barriers to recycling or incinerating packaging was the potential release of toxins into the environment. Less than three years after its proposal, several states had adopted a version of the CONEG model statute.¹⁵⁸

CONEG followed its initial success with another model regulatory act designed to reduce the amount of packaging waste. This model legislation, titled "an Act Concerning Reduction in Packaging Waste," was released in January 1992. It allows companies the following choices to reduce waste from packaging: (1) source reduction (at least a 10% reduction of package weight); (2) reuse of the packaging material; (3) utilization of recyclable materials (a minimum rate of 25% by weight); or (4) recycled content (containing at least 25% recycled post-consumer materials). To date, this legislation has not been seriously considered by any state, but this will undoubtedly change.

CONEG also operates through voluntary efforts. A notable example is their "Challenge to Industry Program" which encourages corporations to voluntarily agree to guidelines spelled out in CONEG's Preferred Packaging Manual. The CONEG challenge was offered to 200 Fortune 500 companies, and thirty-two companies accepted CONEG's challenge.¹⁵⁹ Through this challenge, CONEG hopes to achieve a 50% reduction in packaging materials by the year 2000.¹⁶⁰

157. Drafted by the CONEG Source Reduction Task Force (on file with *Villanova Environmental Law Journal*).

158. These states include New York, the New England states, Iowa, Minnesota, Washington, and Wisconsin. See, e.g., N.Y. ENVTL. CONSERV. LAW §§ 37-0201 to -0213 (1993).

159. See COORS BREWING CO., COORS ACCEPTS CONEG CHALLENGE, MEETS PREFERRED PACKAGING GUIDELINES TO HELP CUT SOLID WASTE, (Oct. 26, 1992); *Northeastern Governors Report 32 Firms Plan to Reduce Excess Packaging Voluntarily*, Env't Rep. (BNA) No. 42, at 2367 (Feb. 14, 1992) (listing companies: Proctor & Gamble Co., Johnson & Johnson, IBM Corp., Digital Equipment Corp., Campbell Soup Co., and Scott Paper Co.) [hereinafter *Northeastern Governors*].

160. See COORS BREWING CO., *supra* note 159; *Northeastern Governors*, *supra* note 159, at 2367.

d. *Florida*

Florida has developed a plan to strengthen the market for recycled materials by using financial incentives to develop a recycling industry.¹⁶¹ Florida encourages companies to form joint ventures for the recycling of particular commodities. The state will then sell waste materials to the ventures, assist them with financing and help them through the necessary regulatory hurdles. Finally, Florida state agencies will buy back products made from the recycled waste materials. While many are skeptical of the program chances of success, it is undeniably an innovative approach that works with markets instead of command and control regulatory methods.¹⁶²

2. *Proposed Federal Legislation*

Despite the lack of experience with recycling on a broad scale, the push is on for federal legislation to increase both supply (required collection) and demand (required use of recyclable materials or imposition of recycled and post-consumer content requirements) of recycled materials. Several legislators have recently introduced federal recycling legislation.¹⁶³ Some were intended to add recycling requirements to the Resource Conservation and Recovery Act (RCRA) reauthorization bill currently before Congress.¹⁶⁴

161. See, e.g., Gail DeGeorge & Peter Hong, *Florida Plans to Move Mountains - of Trash*, BUS. WK., Aug. 24, 1992, at 37; Laurie M. Grossman, *Florida to Buy Back Its Recycled Waste*, WALL ST. J., June 19, 1992, at B1, B6.

162. For further discussion of Florida's approach, see articles cited *supra* note 161.

163. Several proposals were considered in 1992. Senator Max Baucus (D-Mont.) introduced the Resource Conservation and Recovery Act Amendments of 1991, S. 976, 102d Cong., 1st. Sess. §§ 101-503 (1991), 137 CONG. REC. S5261-5285 (daily ed. Apr. 19, 1991) (containing text of proposed bill). This bill proposed national waste reduction and recycling goals. Additionally, the bill would empower EPA to promulgate minimum recycling requirements for specific materials and minimum-content requirements for specific products. This bill cleared the Senate Environment and Public Works Committee, but never reached the floor for a vote. Representative Cardiss Collins (D-Ill.) offered the National Recycling Markets Act, H.R. 2746, 102d Cong., 1st. Sess. (1991), 137 CONG. REC. H5048 (daily ed. June 25, 1991). This bill went even further than the Baucus bill. It sought to impose even more extensive national minimum-content requirements. The Collins bill died in committee. A rival bill, without recycling requirements, was approved by the House Energy and Commerce Committee but never reached the floor. See *Second Congressional Session Ends, Leaving Decisions for Next Congress*, *supra* note 23, at C-1; Cannon et al., *supra* note 24, at 24.

164. Bills to reauthorize RCRA were approved by both House and Senate committees in 1992. A wide-range of amendments to expand the scope of this

Although the Clinton presidential campaign was noncommittal in this area, one should expect that the Clinton administration will be sympathetic to proposed recycling legislation. President Clinton's only campaign promise on the recycling issue was to promote "revenue neutral" tax incentives for the use of recycled materials; Vice-President Gore was even less committal.¹⁶⁵ Their records also send mixed signals.

President Clinton's record as Governor of Arkansas coupled with his short term as President suggest that he would not support environmental protection legislation if it conflicted with job creation. However, environmental clean-up efforts - which necessarily involve job creation - would most likely be supported by the President. Vice-President Gore, on the other hand, is a passionate defender of the environment. His best selling statement on environmental issues, *Earth in the Balance*, indicates a lengthy study of the issues and personal support for federal legislation to correct environmental problems.¹⁶⁶

V. RECOMMENDATIONS FOR FEDERAL ACTION

The question we are left with is what action, if any, should Washington take. Both environmental advocates and industry will seek federal legislation to preempt existing state plans and establish a uniform federal waste management plan. Many argue that federal legislation is necessary. Environmental activists argue that state-by-state legislation will not stimulate the demand for recycled materials.

Some corporate interests argue that uniform legislation is necessary to avoid a series of contradictory regulations at the state level. Another corporate concern is that a nationwide industry is forced to adopt the most stringent requirements of just one state for all its nationally-distributed production. Other industry sources would prefer to legally challenge existing state regula-

law were considered. See Cannon et al., *supra* note 24, at 21-26. Many of these proposed amendments were defeated in committee and only the House bill ultimately contained recycling requirements. Neither the Senate nor House version ever made it to a floor vote. *Second Congressional Session Ends, Leaving Decisions for Next Congress*, *supra* note 23, at C1. With a new Congress, and since neither industry nor environmental interests are pleased with the current situation, extensive debate can be expected in the coming months.

165. See Dianne Dumanoski, *Environment Not Gaining Ground During Campaign*, BOSTON GLOBE, Oct. 4, 1992, at 1; Timothy Noah, *Gore Treads Softly as Environmental Point Man, Fearing GOP Efforts to Label Him an Extremist*, WALL ST. J., Sept. 16, 1992, at A18.

166. ALBERT GORE, JR., *EARTH IN THE BALANCE*, 158-59, 333-34 (1992).

tions as unduly burdensome on interstate commerce. Finally, Washington could choose to maintain the status quo, allowing the present combination of voluntary compliance and individual state regulation to develop further.

A. Why We Need Further Experimentation

Finding materials for recycling is not a serious problem. The supply side of the equation is readily handled by existing voluntary efforts or municipal regulations. In fact, the major "scandal" of recycling is that the sorted garbage often ends up in landfills because of limitations on the demand side of the equation.¹⁶⁷ The demand side is a different and difficult problem. Serious barriers must be overcome before the demand for waste as a production raw material significantly increases. This article has already illustrated the often enormous technical and economic disincentives involved with collecting, sorting, and processing different materials. Any future legislation should take both sides of the equation into account.

Regulating without regard to the technical issues involved with each material will result in costly mistakes. For example, the proposed Massachusetts scheme would have little immediate impact on paper, glass, and metal packaging, but would, in effect, ban the use of many plastic resins. Recycling can also prove to be prohibitively expensive. One commentator argues that curbside recycling programs frequently exceed the cost of landfilling garbage.¹⁶⁸

Difficult choices must be made. If one disregards a product's toxic effects, it appears that if the scrap value of a material is low, and the uses of the recycled material are limited, recycling is an overall losing proposition. Other solutions are needed.

Unanswered questions and the need to create a viable recycling infrastructure suggest that immediate federal action is not appropriate. Policy makers simply do not know enough about what they are trying to accomplish. Wide-scale recycling is relatively new in this country, and most current efforts to recycle many products are, at best, clearly experimental. There is simply not enough data to analyze the technical merits and economic costs of recycling versus landfilling of many products. I submit that we need to continue the process of experimentation.

167. See Allen *supra* note 43.

168. See Allen *supra* note 43, at A1 and A4 (quoting Lynn Scarlett, Reason Foundation).

To do nothing might be irresponsible in the light of what many consider a potential environmental catastrophe, but hastily enacted, bad legislation at the federal level might be even worse. The state laboratories should be allowed to experiment. Those experiments that prove viable will no doubt be adopted elsewhere, perhaps even by the federal government. Those that do not will disappear.

Likewise, certain programs may make sense only in limited areas or for certain materials. For example, the costs of recycling versus landfilling may be radically different in New Jersey than in Nevada. New Jersey lacks adequate landfill space. It also has a concentrated population, short distances between population centers, and a large industrial base that could provide recycling and reprocessing services. By contrast, Nevada has large amounts of barren land that could be used for landfills. Nevada is also more sparsely populated, has greater distances between its population centers, and has a limited industrial base. Nationally imposed recycling would create an enormous and unnecessary burden on states like Nevada when the states with the problems, New Jersey for example, could adopt their own state laws to fix specific problems without affecting other states.

B. What the Federal Government Should Do Today

Naturally the federal government has some role to play. At the present time, the federal government could best help by: (1) encouraging recycling efforts, and (2) removing barriers to the implementation of recycling programs. The following specific actions should be considered.

1. Procurement requirements that encourage government agencies to purchase products made from recycled materials whenever possible. This action would increase the demand for post-consumer waste and increase the value of scrap material.¹⁶⁹
2. Eliminate current federal regulations that hamper recycling efforts. For example, NiCd battery manufacturers must ship their batteries to Europe or Asia for recycling because EPA regulations prevent this activity in the United States. Additionally, the federal government must realize that plans like those in Minnesota and Florida might subject participating firms to antitrust challenges.

169. Some states have already taken steps in this direction. *Environment, Pennsylvania, Maryland, Kentucky Lead in Recycled Paper Purchases, Survey Finds*, Daily Rep. for Executives (BNA) No. 205, at A14 (Oct. 22, 1992), available in LEXIS, NEXIS Library, DREXEC File.

At least temporarily, the federal government should consider easing, or creating exemptions to, antitrust regulations that discourage recycling activities.

3. Work with the international community for global solutions. This will reduce the tendency of national environmental solutions to create trade barriers. An example is the need for standardized resin coding. Presently a manufacturer who wishes to provide resin coding to assist sorting for recycling of plastics must adopt different coding systems for different countries.

4. Examine subsidies, tax laws, and other policies that bias material selection towards virgin materials. Changes should be made to create a level playing field for recycled materials, where politically feasible. However, the current federal budget deficit should prohibit subsidies as viable stimulants for establishing a recycling infrastructure.

5. Draft voluntary standards for packaging materials initially, and, later, for products. This would move industry towards a uniform, environmentally-sensitive position, while still allowing for individual and local variations. These standards, like the voluntary standards issued by the Federal Trade Commission on "green" marketing, should be created with input from industry, environmental groups, and the public.¹⁷⁰

VI. CONCLUSION

The reduction of waste in our society is important, but so is continued economic growth. Recycling programs, when done rationally and cost-effectively, offer a way to reduce waste without hindering economic growth. State or federal actions that increase the demand for recycled products and also remove barriers to experimentation would be the most helpful.

Total inaction by federal, state, and local governments will result in failure to achieve either goal. Without government support for recycling efforts, it is unlikely that market incentives will successfully accomplish significant waste reduction. Failure to change industry habits will make American companies less competitive globally and ultimately challenge our economic growth.¹⁷¹ On the other hand, hastily adopted federal legislation

170. *FTC, 32 States Reach Agreement with GE Over Environmental Claims for Light Bulbs*, Env't Rep. (BNA) No. 23, at 1918-19 (Nov. 27, 1992). Subsequently, on July 28, 1992, the FTC has released *Guides for the Use of Environmental Marketing Claims* (available from the FTC, 6th Street and Pennsylvania Avenue N.W., Washington, D.C. 20580).

171. In the future companies that cannot use post-consumer materials in

would unduly burden industry and hamper economic growth. Costs would be incurred, but there would be no assurance of successfully reducing waste.

Justice Brandeis, in the midst of the Great Depression, suggested that a way out of that crisis was to let the states serve as laboratories to try novel economic and social experiments. If unsuccessful, they could be abandoned. If successful, they could be adopted elsewhere. Perhaps the solution to the present waste crisis is a similar one.

their products will have a hard time selling into the European market. This would create an advantage for American manufacturing companies over lesser developed rivals in Asia, Eastern Europe, and Latin America, which probably lack access to post-consumer materials.

